

CLAIMS

1. A missile suitable for controlled flight through a fluid medium having an elongate body portion of relatively high inertia and a control portion of relatively low inertia which can rotate freely on the body portion about the longitudinal axis of the missile, wherein:
- (1) the control portion has an aileron which is fixed at a predetermined and constant angle of incidence so that, in flight of the missile, the force of reaction between the aileron and the fluid medium gives to the control portion a tendency to rotate within the fluid medium,
- (2) the body portion is provided with control means which induce in the body portion a rate of change of roll angle of the body portion relative to the fluid medium which is different from that of the control portion,
- (3) the control portion includes an elevator which is fixed at a predetermined and constant angle of incidence to react at all times during the flight of the missile against the fluid medium incident upon it to impose an instantaneous lateral force on the missile,
- and the missile includes
- (1) detecting means for generating an error

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signal indicative of a discrepancy between an instantaneous flight path of the missile and a chosen flight path, and

5 (2) steering means comprising steering logic responsive to said error signal for generating a missile steering signal and a clutch responsive to the steering signal for limiting the free rotation between the body portion and
10 the control portion of the missile such that, in response to the error signal, the steering means biases the control portion towards that roll angle at which the transverse force imposed on the missile by the elevator is such
15 as to reduce said discrepancy.

2. A missile as claimed in claim 1, wherein the control portion is provided as a nose section of the missile.

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3. A missile as claimed in claim 1, wherein the aileron is provided as a pair of fixed ailerons at opposite ends of a first transverse diameter.

25 4. A missile as claimed in claim 3, wherein the elevator is provided as a pair of fixed elevators at opposite ends of a second transverse diameter, itself transverse to the said second diameter.

30 5. A missile as claimed in claim 1, including detecting means to gather information from a radiation beam defining a flight path for the missile.

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6. A missile as claimed in claim 5, wherein the radiation of the beam is electromagnetic, and coherent.

7. A missile as claimed in claim 6, wherein the
5 detecting means is sensitive to laser radiation.

8. A missile as claimed in claim 7, wherein the
detecting means comprises two crossed, plane polarising
elements each covering a photodiode element.
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9. A missile as claimed in claim 5, wherein the
beam is modulated in such a way that the information
gathered by the said detecting means is sufficient to
determine the radial and angular displacement of the
15 missile from a reference axis along the beam.

10. A missile as claimed in claim 1, wherein the
said clutch is an electromagnetic clutch.

20 11. A missile as claimed in claim 1, wherein the
said clutch comprises a piezoelectric device which, by a
change in a dimension thereof, brought about by said
steering signal, exerts a frictional resistance to the
free rotation of the control portion.

25 12. A missile as claimed in claim 1, wherein the
clutch utilises the Johnson-Raebeck effect in that it
comprises a device of a material which suffers a change
in a coefficient of friction thereof upon being
30 subjected to an electrical stress.

13. In combination, a missile as claimed in claim
1 and means to generate a beam to define a flight path

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for the missile.

14. In combination, a plurality of missiles as
claimed in claim 1 and a carrier missile, to which the
5 said plurality have a relationship as carried,
sub-missiles.

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